

Appl. No. 10/643,394  
Reply to Office Action of February 27, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) An ink-jet recording sheet comprising;  
a support; and  
a porous layer including fine particles and a polymer compound crosslinked through side chains of the polymer on the support, said porous layer having a void volume of from 15 to 40 ml/m<sup>2</sup>,

wherein the crosslink of the crosslinked polymer compound is formed by irradiating ionizing radiation to a hydrophilic polymer compound which has a polymerization degree of not less than 300 and a plurality of side chains on a main chain of the hydrophilic polymer compound, and

wherein a weight ratio of the fine particles to the polymer compound crosslinked through side chains of the polymer in the porous layer is from 2:1 to 50:1.

Appl. No. 10/643,394  
Reply to Office Action of February 27, 2006

Claim 2 (Canceled).

3. (Previously Presented) The ink jet recording sheet of claim 1, wherein the weight ratio of the fine particles to the crosslinked polymer in the porous layer is from 6 : 1 to 15 : 1.

4. (Original) The ink jet recording sheet of claim 1, wherein the porous layer includes a multivalent metal compound.

5. (Original) The ink jet recording sheet of claim 1, wherein a diameter of fine particles is from 0.005 to 0.4  $\mu\text{m}$ .

6. (Original) The ink-jet recording sheet of claim 1, wherein the hydrophilic polymer compound has a photosensitive group capable of dimerization by the ionizing radiation, on the side chains.

7. (Withdrawn-Previously Presented) A producing method of the ink-jet recording sheet of claim 1 comprising steps of:  
providing on a support a layer including fine particles and

Appl. No. 10/643,394  
Reply to Office Action of February 27, 2006

a hydrophilic polymer compound which has plural side chains on a main chain thereof and a polymerization degree of not less than 300; and

irradiating ionized radiation to the polymer compound to form crosslinking through the side chains to form a porous layer.

**8. (Withdrawn-Previously Presented)** The producing method of an ink-jet recording sheet of claim 7, wherein a weight ratio of the fine particles to the polymer compound formed by the crosslinking through the side chains is from 2 : 1 to 50 : 1.

**9. (Withdrawn-Previously Presented)** The producing method of an ink-jet recording sheet of claim 7, wherein a weight ratio of the fine particles to the polymer compound formed by the crosslinking through the side chains is from 6 : 1 to 15 : 1.

**10. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 7, wherein the porous layer includes a multivalent metal compound.

Appl. No. 10/643,394

Reply to Office Action of February 27, 2006

**11. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 7, wherein a diameter of the fine particles is from 0.005  $\mu\text{m}$  to 0.4  $\mu\text{m}$ .

**12. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 7, wherein the hydrophilic polymer compound has a photosensitive group capable of dimerization by the ionizing radiation, on the side chains.

**13. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 7, wherein the porous layer is formed by coating a coating composition comprising the fine particles and the hydrophilic polymer compound which has plural side chains on the main chain thereof and a polymerization degree of not less than 300, and irradiating an ionizing radiation to the polymer compound in the coated layer to form the crosslink between the side chains.

**14. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 13, wherein the irradiation of the ionizing

Appl. No. 10/643,394  
Reply to Office Action of February 27, 2006

radiation is applied at a time in which the weight ratio of solvent to the solid component in the coated layer is not less than 100%.

15. **(Withdrawn)** The producing method of an ink-jet recording sheet of claim 13, wherein the polymer compound in the coated layer is irradiated the ionizing radiation so that the elastic modulus of the coated layer after the irradiation is not less than 1.5 times of that of the coated layer before the irradiation and the viscosity coefficient of the coated layer after the irradiation is not less than 1.5 times of that of the coated layer before the irradiation.

16. **(Withdrawn)** The producing method of an ink-jet recording sheet of claim 14, wherein the irradiation of the ionizing radiation is further applied at a time in which the weight ratio of solvent to the solid component in the coated layer is less than 100%.

17. **(Withdrawn)** The producing method of an ink-jet recording sheet of claim 13, wherein the coated layer is dried after the

Appl. No. 10/643,394  
Reply to Office Action of February 27, 2006

irradiation, in atmosphere at a temperature higher not less than 10 °C than that before the irradiation.

**18. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 13, wherein after the coated layer is dried, the coated layer is stood for not less than 24 hours in atmosphere at a temperature of not less than 30 °C.

**19. (Withdrawn)** The producing method of an ink-jet recording sheet of claim 7, wherein the ionizing radiation is ultraviolet ray.